

New and renew

This mill in Austria recently revived its “green” status with a new ANDRITZ recovery boiler. In addition, ANDRITZ also helps renew the existing mill with small upgrades to improve efficiency.

Mondi's Frantschach mill in the south of Austria is recognized as one of the leading manufacturers of sack kraft and specialty kraft papers, as well as specialty pulps. The location is home to a pulp mill and three paper machines (two for sack paper and one for machine-glazed kraft papers). “Continuous improvement and development is a hallmark of this location,” says Managing Director Gottfried Joham. “This is the most modern sack kraft paper production facility in the world.”

Keeping the mill modern is a step-by-step process. Some steps, like new recovery boilers, are large. Others, like upgrades to the fiberline, are smaller. But, all require a team effort. “As soon as we sign a contract, we are a team,” Joham says. “We don't sit back. Our people are very experienced, and very involved.”

New and green: RB4

The teamwork was evident with the new recovery boiler project (RB4). Mondi's needs were clearly defined from the start. Perhaps some of this is due to the background of Manfred Hacker, Pulp Mill Manager. Hacker has 20+ years' experience in the boiler business. “We wanted a highly efficient boiler that would fit within our capital budget and that would help us further close our chemical cycle without increasing emissions,” he says. “We wanted it to burn all the gases from our pulp mill. And, it was important to conserve the sulfidity to improve our pulp quality.”

RB4 was going to replace two older units (1958 and 1972). The pressure parts in the oldest unit were at end-of-life, and costly repairs were on the horizon for the other unit. Together, the boilers represented a bottleneck to production.



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Managing Director
Mondi Frantschach

◀ Frantschach's Recovery Boiler 4 (RB4) replaced two older units which were approaching end-of-life. The boiler allows the mill to produce steam and electricity that is carbon-neutral, increasing electricity production from the same amount of black liquor.



▲ (Left to right): Günter Leitner, Mondi's Technical Manager and Project Manager for RB4; Marja Heinola, Director of Recovery Boiler Sales for ANDRITZ; and Manfred Hacker, Pulp Mill Manager inside the new recovery boiler.

Following the start-up of that boiler in 2006, Cacia's Mill Manager, José Manuel Nordeste, had this to say: “This recovery boiler works perfectly – like a Swiss watch!” (See *Spectrum* No. 21 for related story about Portucel Soporcel)

The team from Frantschach visited Cacia. “The information shared by Portucel Soporcel was very helpful,” says Günter Leitner, Mondi Frantschach's Technical Manager and the Project Manager for RB4.

“We got the green light from management in February 2011 to prepare a detailed plan for a new boiler,” Hacker says. “In parallel, we obtained all the approvals from the authorities. Within months, the investment was approved.”

A Portuguese “twin”

Hacker's experience in the boiler business gave him insight how to proceed. “My vision was to build a copy of an existing boiler that was working quite well,” he says. “This would allow us to see the boiler ahead of time, and to save money on engineering costs. So, we asked each supplier to show us a boiler similar to the one we were planning at Frantschach.”

Marja Heinola, Director of Recovery Boiler Sales for ANDRITZ, showed the data for an ANDRITZ recovery boiler installed at Portucel Soporcel's Cacia mill in Portugal.

“RB4 is about a 90% copy of Cacia,” Heinola says. “The basic geometry was an excellent starting point. The black liquor at Frantschach is different, so we optimized the design within that geometry. There is more heat transfer surface in the Frantschach boiler, particularly in the superheaters. The material selection and other design features inside RB4 were tailor-made.”

The contract with ANDRITZ was signed early 2012 for EPC delivery of the recovery boiler (excluding foundation work). Antti Räisänen was the ANDRITZ Project Manager. “We had detailed discussions during the sales phase, which helped us streamline project execution,” Räisänen says. “Mondi has very high quality standards, which set everyone's expectations, and we focused on the critical issues.”

“We had everything clarified and planned ahead of time,” Leitner says. “That way, there were no contract surprises once the work began. There are enough challenges building a boiler inside an existing mill, without worrying about contract issues.”

“Erection was challenging because of the limited storage area near the boiler,” Räisänen recalls. “We created an area outside the mill gates and transported the large parts by truck.”

“This could have been a problem, but the logistics were well-managed and done in a very professional way,” Leitner says.

The first liquor firing of RB4 occurred in July 2013, and operational tests were completed by the end of August. “We took over the boiler in September 2013,” Leitner says. “All this was according to our plan; we were right on time.”

“Collaboration and cooperation were excellent,” Hacker says. “We got a well-designed boiler, meeting our requirements, and fitting exactly into our environment here in Frantschach.”

Key to success was that Mondi and ANDRITZ worked together on the commissioning of the boiler. “Our people operated the boiler under the direction of ANDRITZ.”



◀ Manfred Hacker, Pulp Mill Manager (left), with Günter Leitner, Mondi's Technical Manager and the Project Manager for RB4.

Hacker says. "They got hands-on experience learning how the boiler behaved. So, the actual start-up and handover were very smooth."

Another key point was that operators and maintenance people spent one week "training" with the mill people in Cacia. "They could observe and ask questions of the experienced operators at Cacia," Leitner says. "This was really well organized by ANDRITZ and very beneficial to us."

Sustainable "liquid wood"

"This is a highly efficient boiler with steam parameters of 87 bar and 480° C to fit the existing turbines," says Hacker. "It improves the efficiency of our steam turbines to the point where we now produce sufficient energy to sell electricity to the grid. We have increased electricity production by 30%. By removing the bottleneck, we can increase pulp production by 15,000 t/a."

An additional benefit is that the output of the new RB4 also allows the mill to increase the amount of district heating steam for the nearby city of Wolfsberg.

Unlike other European nations where this "green energy" creates economic incentives by the state, Austria does not grant subsidies for burning black liquor, even though it is a renewable, sustainable fuel source. "If you burn solid wood, you get a subsidy," Joham explains. "If you burn liquid wood, which is what black liquor is,

"To my knowledge, this is the first mill burning SOG and CNCG in one burner without a supporting flame."

Manfred Hacker
Pulp Mill Manager
Mondi Frantschach

you don't get the subsidy here in Austria. You can imagine what this has done to the wood price in our country."

The Frantschach mill produces steam and electricity that is carbon-neutral. "We burn wood to generate power," Joham says. "But, before we burn it, we convert over one million solid cubic meters of wood each year into fiber, then into pulp, and then into paper. Each step adds value. And, each step requires significant investments in technology and people."

A new approach to gas handling

According to Hacker, Frantschach is the first mill to regularly burn stripper off gases (SOG) and concentrated non-condensable gases (CNCG) in one burner without a supporting flame. "We have discussed this with recovery boiler authorities and have submitted a revision to the best practices guidelines within Mondi," he says. "This is proven safe and will reduce our fossil fuel usage to save us money."

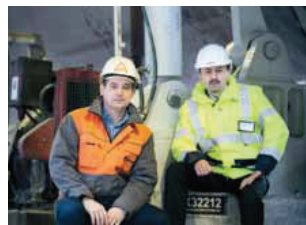
Renew: fiberline

Digester Double-Wash upgrade. The continuous digester at Frantschach produces well above the original design of 450 t/d. This degree of loading limited the effectiveness of the in-digester washing. In 2008, Frantschach's digester was the first to receive a Double-Wash modification from ANDRITZ.

"This upgrade is ideal for overloaded, Hi-Heat digesters," says Paavo Tolonen, ANDRITZ Service Product Manager for Cooking. "We converted the digester to Double-Wash mode by modifying the center pipe and replacing the vertical screens in the extraction zone with SureFlow diagonal screens. This resulted in an improved cook and more efficient washing."

SureFlow screens have considerably more open area than vertical slotted or vertical bar screens, increasing throughput. The contour of the slots and the radius edges reduce plugging.

"The SureFlow screens are working very well," says Stefan Raffalt, Head of Woodyard and Fiberline. "They have much more capacity and the cleaning is much easier. The old screens plugged and we would have to cut out all 28, clean them, and weld them back in again during each shutdown. This consumed a lot of time and effort."



▲ Another interesting upgrade at the Mondi mill is the installation of an emergency drive unit for the lime kiln. This provides a low-cost additional drive to keep the kiln rotating, avoiding burnout of the refractory, if the main drive for the kiln is stopped suddenly. In the photograph above are Hannes Perchtold, Mondi's Mechanical Maintenance Manager (left) and Walter Scholz-Sommerbauer of ANDRITZ.

Top Separator rebuild. In 2009, ANDRITZ upgraded the top separator device by replacing the screen basket with a more rigid design and adding a bottom bearing with a labyrinth sealing system. This was the first digester in the world to utilize the new bottom bearing system.

"We used to have a problem with the wearing of the screen basket," says Hannes Perchtold, Mechanical Maintenance Manager. "The top separator had a long screw with a small diameter, suitable for the original capacity. But, as increased capacity, we essentially doubled the amount of chips pressing on the screw. This caused it to move off-center and score the screen basket. We could not run more than a year without replacing the basket."

"We developed a solution jointly with Frantschach," says Walter Scholz-Sommerbauer, ANDRITZ Customer Ser-

vice Manager. "The bottom bearing with sealing system keeps the screw in place and avoids abnormal wear of the basket. It can easily run for the full 18 months between shutdowns, and longer."

Outlet Device for impregnation vessel. In 2013, ANDRITZ replaced the 37-year-old outlet device on the impregnation vessel. "The old device had two mechanical gearboxes driven by DC motors," says Stefan Sattler, Head of the Mechanical Engineering Project Department at Frantschach. "When a gearbox failed, it was impossible to move the scraper to evacuate the chips. You can imagine the time and effort required to empty a very large vessel in order to repair the device."

"The new Outlet Device is direct-hydraulic driven without gearboxes," explains Scholz-Sommerbauer of ANDRITZ. "The reliability is extremely high."

Walter Scholz-Sommerbauer, ANDRITZ Customer Service Manager; Hannes Perchtold, Mechanical Maintenance Manager; Paavo Tolonen, ANDRITZ Service Product Manager for Cooking; Stefan Raffalt, Head of Woodyard and Fiberline; and Stefan Sattler, Head of the Mechanical Engineering Project Department with the Outlet Device for the impregnation vessel. ▼

"Our challenge was that there were only four days allotted for dismantling the old device and installing the new one," says Sattler, who was Project Manager for the upgrade. "This included removing the concrete foundation for the old gearbox."

"The challenge for our engineers was to design all the flanges to fit without any piping or other modifications to the vessel," says Tolonen of ANDRITZ. "Since we had such a tight deadline and were working in a very confined space under the vessel, we pre-fabricated the drive system in our workshop."

"I have to say that I was very impressed with the execution," Sattler says. "The start-up went perfectly and it worked well from the very beginning. It has helped stabilize the levels in the digester."

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